biopsy was normal in 35% of investigations, while reactive hepatitis was seen in 43% and fatty liver in 22%. Reactive hepatitis was mild in 6%, moderate in 15%, and severe in 22% of biopsies; fatty liver was mild in 11%, moderate in 7%, and severe in 4% of specimens. An abnormal BSP test was observed in 75% of investigations, raised alkaline phosphatase in about 50%, an abnormal thymol turbidity test in 24%, and diminished prothrombin (Quick) in 20%. A rise in transaminases in serum and in urobilinogen in urine was, however, very rare. A rise in bilirubin (more than 1.0 mg/100 ml) was never observed. There was a close relationship between rheumatoid arthritis activity and abnormal BSP retention, raised alkaline phosphatase, and reactive hepatitis. These tests, however, were not correlated to duration or stage of arthritis nor age of patients. These data were obtained in West Germany.

In a second series in Switzerland, liver function tests, as well as liver biopsies, were carried out in 51 patients with definite rheumatoid arthritis. BSP retention was abnormal and prothrombin in 60% of cases, alkaline phosphatase in 20%, thymol turbidity test in all 25 patients examined. Slightly raised levels of transaminases were seen in about 1/3 of patients, mostly during a relapse of RA. As in the first series there was a high correlation with disease activity, but no correlation with the age of patients, the duration, or stage of disease. Morphological changes of the liver were found in 85% of biopsies, most frequently as a reaction of Kupffer cells. In 27% of cases, mainly during a relapse of RA, a reactive hepatitis with lymphocellular, partially also plasmacellular, infiltration of periportal areas was seen. In 15 cases (27%) a specific immunofluorescence was produced by means of anti-IgG.

During a drug trial of 24 months' duration liver tests were carried out at intervals of 2-4 weeks in 30 patients with definite and active RA. Transient and slightly raised levels of SGOT were found in 21 patients, of SGPT in 11 patients, of alkaline phosphatase in 17 patients, of γ -GT in 22 patients. Pathological results were obtained in 20% of SGOT determinations, 10% of SGPT, 30% of alkaline phosphatase, and 48% of γ -GT determinations. As in the first two series we could not find any influence of anti-rheumatic or cytostatic agents or gold on the results of these liver tests. In 10 control biopsies no signs of drug-induced liver disturbance could be detected.

In summary, in a large number of patients with RA disturbance of liver function and slight morphological alterations, especially mild reactive hepatitis or fatty liver, can be observed. These alterations seem to be related to RA activity and not to therapy.

Lack of correlation of synovial histology with joint damage in rheumatoid arthritis. By D. R. F. HENDERSON, M. I. V. JAYSON, and C. R. TRIBE (*Department of Medicine, University of Bristol; Royal National Hospital for Rheumatic Diseases, Bath; Department of Pathology, Southmead Hospital, Bristol*). Published in full in the *Annals*, 1975, 34, 7.

Radiological changes in the age group 5 to 24 years of the population of Azmoos, Switzerland. By B. ANSELL, J. SIDLER, and W. M. ZINN (*Medizinische Abteilung, Bad Ragaz*)

During the population study at Azmoos, 281 sets of x-rays were taken, of which 147 were from males and 134 from females between the ages of 5 to 24 years, with a completion rate of 90.0%. Films of the hands, feet, and knees were taken, as well as two films of the pelvis according to a technique reported elsewhere. In the 5- to 9-year age group, one boy had a classical avascular necrosis of the left femoral head and in another boy a similar condition of the left navicular bone in the foot was noted. In a boy aged 8 there was a definite periostitis, the exact nature of which is not certain. In the males aged 15 to 19, one boy who had suffered from poliomyelitis at the age of 6 showed marked growth anomalies of the right hand and to a lesser extent of the left foot. Other findings were minimal osteoarthritis, bipartite patella, march fracture. One male aged 12 and two females had doubtful sacroiliac changes; when reassessed 4 to 7 years later these were still doubtful in two cases who now had slight back symptoms, and were definite in the third case, a female now under treatment.

The most interesting aspect of these x-rays were the minor growth anomalies present such as dense epiphyses, unequal development of the carpus, bifid epiphyses in the proximal phalanges of the feet, double epiphyses in the metatarsals, and coned epiphyses of the proximal phalanges. Also accessory ossicles and bony excrescences were noted.

Another interesting feature was the high incidence of minor growth defects of the metatarsals. These again were particularly marked in the young respondents and were often bilateral. The second metatarsal was the one most commonly affected.

The acetabulum was pathologically small in one girl and in one male aged 8 and one further female aged 9, the CE-angle being between 10 and 18°. There were three respondents with an anteversion of the femoral neck above 50°.

A preliminary investigation of stress distribution in lumbar vertebrae. By J. S. SHAH, M. I. V. JAYSON, and W. G. HAMPSON (*Departments of Physics and Medicine, University of Bristol, Bristol Royal Infirmary and the Royal National Hospital for Rheumatic Diseases, Bath*)

The techniques of stress coat analysis and photoelastic analysis were applied to study the stress distribution in isolated single cadaveric vertebrae under a simple compressive force system.

The main findings of the investigation were: (1) Upon the application of an axial compressive force to the body of a vertebra, two principle stress systems are developed, namely tensile stresses which are transverse and compressive stresses which are longitudinal. (2) The stress trajectories on the surface of the bone tend to follow the curvature of the bone in all cases and at each point on the surface the compressive stress is orthogonal to the tensile stress. (3) The rim of the vertebra, the root of the vertebral arch, and the posterior surface of the vertebral body are regions where high stresses develop. (4) The stress trajectories within the vertebral body appear to follow the principle trabecular systems of the vertebra as classified by Japoit and Callois (1925).

Reference

JAPOIT, P., AND CALLOIS, E. (1925) *Rev. Chir. Paris*, 63, 688 (Architecture interieur des vertebres)